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CH2MHILL

October 25, 2001

Thomas S. Sanicola
Modine Manufacturing Company
1500 DeKoven Avenue
Racine, WI 53403

Subject: Well Abandonment Summary – Monitoring Wells MW-3 and MW-4, Modine Manufacturing Company, Camdenton, Missouri

Dear Tom:

CH2M HILL is pleased to submit the Well Abandonment Summary – Monitoring Wells MW-3 and MW-4. Please find one copy of the technical memorandum enclosed.

Please call me at 314-421-0900 ext. 265 with any questions you may have. It has been a pleasure working with you.

Sincerely,

CH2M HILL

Anne G. Bartin for Dan Price

Daniel J. Price, R.G.
Project Manager

c: Bob King – Modine Manufacturing Company
Steven Poplawski - Bryan Cave LLP
Christine M. Kump – Missouri Department of Natural Resources
David Garrett – EPA Region VII

Modine Manufacturing Company – Camdenton, MO Well Abandonment Summary – Monitoring Wells MW-3 and MW-4

PREPARED FOR: Missouri Department of Natural Resources

PREPARED BY: Dan Price – CH2M HILL
Anne Bartin – CH2M HILL

COPIES: Tom Sanicola - Modine Manufacturing Company
Bob King - Modine Manufacturing Company

DATE: October 25, 2001

CH2M HILL is submitting this Technical Memorandum on behalf of Modine Manufacturing Company (Modine). The purpose of the submittal is to summarize the work conducted in abandoning two monitoring wells, MW-3 and MW-4, during the week of October 1, 2001 at Modine's facility located in Camdenton, Missouri.

Introduction

During an investigation required by Missouri Department of Natural Resources (MDNR) in 1995, monitoring wells MW-3 and MW-4 were installed at the Modine site in Camdenton, Missouri. Monitoring well MW-3 was completed at a total depth of 167 feet below top of casing and monitoring well MW-4 was completed at a total depth of 158 feet below top of casing. Both wells were installed on the west side of the property. In February 1997, monitoring wells MW-3 and MW-4 were deepened at the request of the MDNR due to MW-4 being dry during two consecutive monitoring events in August and December 1996. Monitoring wells MW-3 and MW-4 were deepened to depths of approximately 175 feet below top of casing and 195 feet below top of casing, respectively. Monitoring well MW-3 was completed above grade and monitoring well MW-4 was completed flush with the surrounding ground surface.

In 2000, a remedial investigation (RI) of the former Hulett Lagoon was conducted (SECOR, April 2001). The RI consisted of the collection of additional soil samples at the former lagoon and installation of eight additional monitoring wells. The findings of the investigation indicated the presence of a zone of less permeability; an "inhibiting zone" that may in some areas create a separate "perched" groundwater zone and a deeper groundwater zone. When wells MW-3 and MW-4 were deepened in 1997, they may have bridged the less permeable "inhibiting zone" and allowed groundwater (when present) above this zone to migrate to the deeper zone.

Objective

The objective of the well abandonment activities was to properly abandon monitoring wells MW-3 and MW-4 to remove the potential for shallow groundwater migration through the less permeable "inhibiting zone."

Well Abandonment Activities

The well abandonment activities were conducted by drillers from Roberts Environmental Drilling, Inc. that hold Missouri Well Drillers and Pump Installers Permits, issued by the MDNR Division of Geology and Land Survey (DGLS). A representative from CH2M HILL provided oversite of the well abandonment activities. In addition, a representative from the DGLS was onsite to observe the well abandonment activities. Abandonment of monitoring wells MW-3 and MW-4 was conducted in accordance with Missouri Well Construction Rules, 10 CSR 23-4 and is detailed in the following paragraphs.

Monitoring Well 3

Well abandonment activities began with the removal of the above ground well protector from MW-3. The 4-inch open bedrock hole portion of the well was grouted with a high solids bentonite grout from total depth to a depth at the base of the steel casing, which extended to a depth of 63 feet below ground surface (bgs). After the grout was allowed to cure for a minimum of 24 hours, the steel casing was overdrilled to a refusal depth of 12 feet bgs using an eight ¼-inch inside diameter hollow-stem auger. CH2M HILL subcontractors made multiple unsuccessful attempts to remove the steel casing from the hole. As a result, the top three feet of steel casing was cut off in accordance with Missouri Well Construction Rules. The MDNR project manager approved the well abandonment procedural change and the representative from DGLS onsite concurred with the decision. The remaining steel casing was left in place and the 12 ½-inch diameter auger hole and casing was grouted with high solids bentonite grout from the cased depth to the surface using a tremie pipe. After the grout was allowed to settle, soil was placed in the upper two feet of the borehole and compacted to bring the surface back to grade.

Soil cuttings retrieved during abandonment activities were stockpiled on plastic sheeting, screened using a photoionization detector (PID), and covered with a tarp. PID readings indicated the soil was not impacted and, therefore, the soil cuttings were used to restore the site to its original condition.

Monitoring Well 4

Well abandonment activities began with removal of the flush mount well protector from MW-4. The 4-inch open bedrock hole portion of the well was grouted with a high solids bentonite grout from total depth to a depth at the base of the steel casing. The steel casing extended to a depth of 43 feet bgs in MW-4. After the grout was allowed to cure for a minimum of 24 hours, the steel casing was overdrilled to a refusal depth of 20 feet bgs using an eight ¼-inch inside diameter hollow-stem auger. CH2M HILL subcontractors made multiple unsuccessful attempts to remove the steel casing from the hole. As a result, the top three feet of steel casing was cut off in accordance with Missouri Well Construction Rules.

The MDNR project manager approved the well abandonment procedural change and the representative from DGLS onsite concurred with the decision. The remaining steel casing was left in place and the 12 ½-inch diameter auger hole and casing was grouted with high solids bentonite grout from the cased depth to the surface using a tremie pipe. After the borehole was grouted, concrete was placed in the upper two feet of the borehole and compacted to bring the surface back to grade. The surface around MW-4 was further repaired with cold patch asphalt.

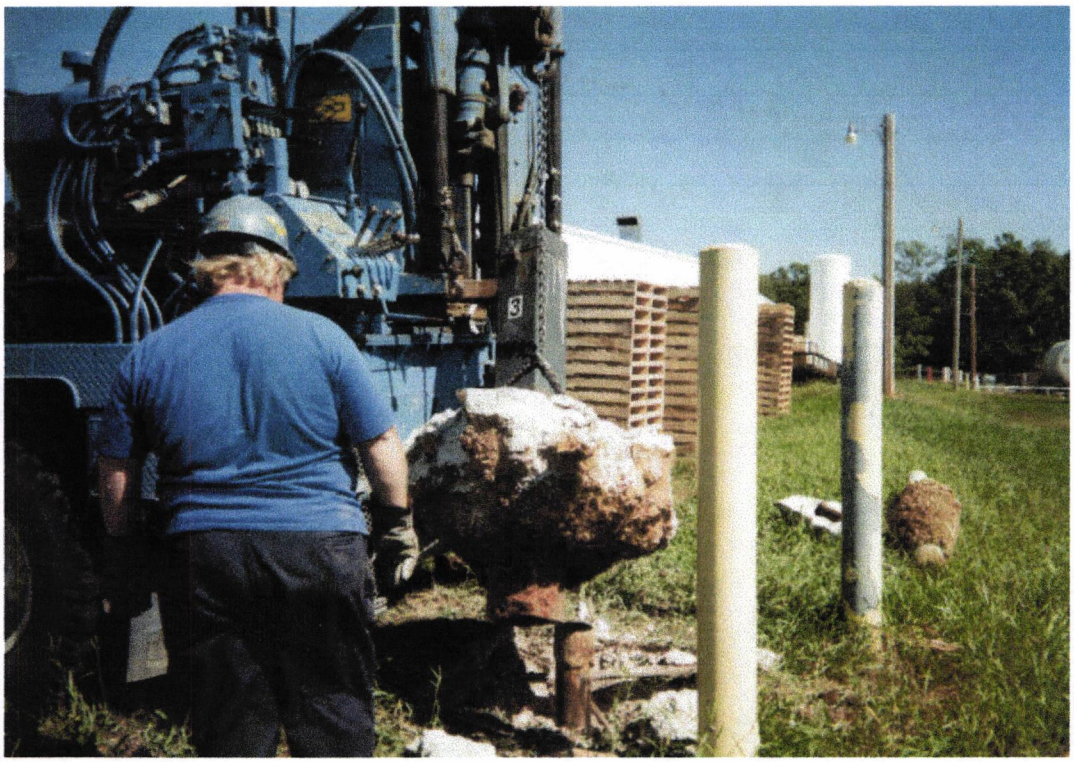
Soil cuttings retrieved during abandonment activities at MW-4 were screened with the PID meter and placed in three 55-gallon drums for future characterization and placement with the soil excavated as part of the Corrective Action work currently being conducted on-site. PID readings indicated the soil was not impacted.

Documentation

Field documentation of well abandonment activities was recorded in a logbook designated for the project. Photographs were taken during the well abandonment for documentation purposes and are provided in Attachment 1.

The drilling subcontractor has submitted an Abandonment Registration Record for each well to the MDNR Division of Geology and Land Survey (DGLS), in accordance with Missouri Well Construction Rules which requires submittal within 60 days of the completion of plugging activities. A copy of the reports is provided in Attachment 2.

Attachment 1 – Photographs

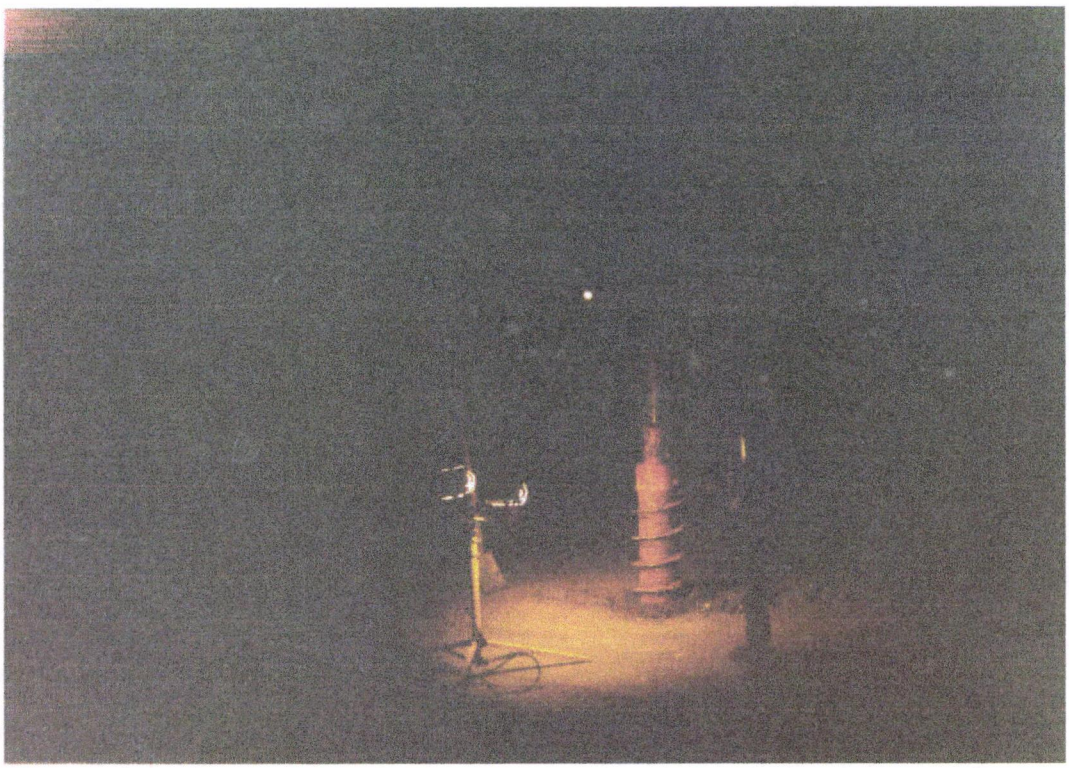


Removal of above ground well protector from monitoring well MW-3 (facing east).

Overdrilling monitoring well MW-3 using an 8 ¼-inch inside diameter hollow-stem auger.

Steel casing of monitoring well MW-3 cut three feet below ground surface.

Grouting monitoring well MW-3 with high solids bentonite slurry using tremie pipe.



Overdrilling monitoring well MW-4 using an 8 ¼-inch inside diameter hollow-stem auger.

Steel casing of monitoring well MW-4 cut three feet below ground surface.

Surface restoration using cold asphalt patch at former monitoring well MW-4.

Attachment 2 – Abandonment Registration Records

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY
(573) 368-2165

ABANDONMENT REGISTRATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 266842	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	TRANSMITTAL NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE /

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME	TELEPHONE	VARIANCE NUMBER (IF APPLICABLE)
Mag ne Manufacturing Company	[illegible]	—

OWNER ADDRESS	CITY	STATE	ZIP CODE	WELL CERTIFICATION NUMBER (IF APPLICABLE)
171 Sunset Dr	Camdenton	Mo	65[illegible]	—

ADDRESS OF WELL SITE (IF DIFFERENT THAN ABOVE)	CITY	STATE	ZIP CODE
Same			

SITE NAME	WELL NUMBER	INFORMATION VERIFIED BY OWNER SIGNATURE (WELL OWNER)	DATE
Same	#3	X	

SKETCH THE LOCATION TO THE WELL INCLUDING MILEAGE ON ALL ROADS TRAVELED FROM NEAREST TOWNS OR HIGHWAYS

See Attached Site Map

LOCATION OF WELL
LAT. 38 ° 0 ' 35 "
LONG. 92 ° 45 ' 30 "
AREA 1
ELEV
COUNTY Camden
SMALLEST ¼ LARGEST ¼ ¼
SEC. TWN. N RNG. E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE

DRILLER NOTES:
Removed Above Ground Protector, Tremie Grouted
4" open bedrock hole from 174' to 60', Tried to
Overdrill Casing w/8¼" HSA; Auger refusal @ 13', Cut
off Casing 3' b.g.s & Tremie Grouted Full

ABANDONMENT INFORMATION

FORMER USE OF WELL
☐ HAND DUG ☐ IRRIGATION
☐ DOMESTIC ☐ SOIL BORING/GEOPROBE
☐ MULTI-FAMILY ☒ MONITORING
☐ PUBLIC WATER SUPPLY ☐ MINERAL EXPLORATORY TEST HOLE
☐ HEAT PUMP ☐ OTHER

ORIGINAL DRILLER (IF KNOWN)	DATE ORIGINALLY DRILLED (IF KNOWN)	STATIC WATER LEVEL
—	'95	116.5'

DEPTH OF THE WELL	LENGTH OF CASING	CASING DIAMETER	DRILL HOLE DIAMETER (IF KNOWN)
174'	~~163'~~ 63'	5"	—

PUMP REMOVED FROM WELL? ☐ YES ☐ NO N/A

WAS THE CASING CUT OFF THREE FEET BELOW GROUND SURFACE? ☒ YES ☐ NO ☐ REMOVED

TYPE OF CASING ☐ PLASTIC ☐ CONCRETE ☒ STEEL ☐ OTHER

GROUT INSTALLATION METHOD
☐ GRAVITY
☒ TREMIE
☐ EXCAVATION

GROUT MATERIAL USED
NEAT CEMENT: ☐ HI-EARLY ☐ TYPE 1
BENTONITE: ☒ SLURRY ☐ CHIPS ☐ GRANULAR ☐ PELLETS ☒ OTHER 30% High Solids

HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 14-15

NUMBER OF BAGS OF GROUT USED 14

POUNDS OF GROUT PER BAG 50#

TYPE OF FILL MATERIAL USED
☐ GRAVEL ☐ AG-LIME
☐ SAND ☐ OTHER N/A

AMOUNT OF FILL MATERIAL USED N/A CIRCLE ONE CU. YDS./TONS

DEPTH TO TOP OF FILL MATERIAL FROM THE SURFACE N/A

MULTIPLE WELLS ☒ YES ☐ NO

WAS THE WELL ABANDONED BECAUSE OF HOOKING UP TO A PUBLIC OR RURAL WATER SUPPLY DISTRICT? ☐ YES ☒ NO

IF YES, WHAT IS THE NAME OF THE WATER DISTRICT:

WELL CHLORINATED BEFORE PLUGGING? ☐ YES ☒ NO

AMOUNT USED FOR THE CHLORINATION
GALLONS OF CHLORINE
POUNDS OF CHLORINE
TABLETS OF CHLORINE

DATE WELL WAS PLUGGED 10/2/01

REASON WELL WAS PLUGGED

REMARKS

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	SIGNATURE (CONTRACTOR)	PERMIT NUMBER	DATE
X Dan Price (CH2M Hill)	002460-M	X Tom Dunlap	00321 WPM	10/11/01

MO 780-1603 (4-99)

DISTRIBUTION: WHITE/DIVISION CANARY/CONTRACTOR PINK/OWNER
MAIL WHITE COPY TO: DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 250, ROLLA, MO 65402
ENCLOSE NO FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL COMPLETION

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY
(573) 368-2165

ABANDONMENT REGISTRATION RECORD

OFFICE USE ONLY	DATE RECEIVED
REF. NO. 266843	
C.R. NO.	CHECK NO.
STATE WELL NUMBER	TRANSMITTAL NO.
ENTERED Ph 1 Ph 2 Ph 3	APPROVED BY / ROUTE / /

INFORMATION SUPPLIED BY WELL OR PUMP INSTALLATION CONTRACTOR

OWNER NAME: Mar... Manufacturing Company	TELEPHONE: 573-3[illegible]-5[illegible]3		VARIANCE NUMBER (IF APPLICABLE): —
OWNER ADDRESS: 179 S. Sunset Dr.	CITY: Camdenton	STATE: MO	ZIP CODE: 65020
ADDRESS OF WELL SITE (IF DIFFERENT THAN ABOVE): Same	CITY	STATE	ZIP CODE
			WELL CERTIFICATION NUMBER (IF APPLICABLE): —
SITE NAME: Same	WELL NUMBER: #4	INFORMATION VERIFIED BY OWNER SIGNATURE (WELL OWNER): X	DATE

SKETCH THE LOCATION TO THE WELL INCLUDING MILEAGE ON ALL ROADS TRAVELED FROM NEAREST TOWNS OR HIGHWAYS

See Attached Site Map

LOCATION OF WELL
LAT. 38 ° 0 ' 35 "
LONG. 92 ° 45 ' 30 "
AREA 1
ELEV —
COUNTY Camden
SMALLEST ¼ LARGEST ¼ ¼
SEC. ____ TWN. ____ N RNG. ____ E OR W

DESCRIBE LOCATION OF THE WELL SO WE WOULD BE ABLE TO VISIT THE WELL SITE

DRILLER NOTES: Tremie grouted 4" open bedrock hole from 195' to 40'. Removed Floor Mount, Tried to Overdrill Casing but 8¼ H.S.A.'s Also Refusal @ 20'. Cut Casing off 3' b... and grouted full.

ABANDONMENT INFORMATION

FORMER USE OF WELL: ☐ HAND DUG ☐ DOMESTIC ☐ MULTI-FAMILY ☐ PUBLIC WATER SUPPLY ☐ HEAT PUMP ☐ IRRIGATION ☐ SOIL BORING/GEOPROBE ☒ MONITORING ☐ MINERAL EXPLORATORY TEST HOLE ☐ OTHER	ORIGINAL DRILLER (IF KNOWN): —	DATE ORIGINALLY DRILLED (IF KNOWN): '45	STATIC WATER LEVEL: 172.7'
DEPTH OF THE WELL: 195'	LENGTH OF CASING: 43'	CASING DIAMETER: 5"	DRILL HOLE DIAMETER (IF KNOWN): —
PUMP REMOVED FROM WELL? ☐ YES ☐ NO N/A	WAS THE CASING CUT OFF THREE FEET BELOW GROUND SURFACE? ☒ YES ☐ NO ☐ REMOVED	TYPE OF CASING ☐ PLASTIC ☐ CONCRETE ☒ STEEL ☐ OTHER	
GROUT INSTALLATION METHOD: ☐ GRAVITY ☒ TREMIE ☐ EXCAVATION	GROUT MATERIAL USED: NEAT CEMENT ☐ HI-EARLY ☐ TYPE 1; BENTONITE ☒ SLURRY ☐ CHIPS ☐ GRANULAR ☐ PELLETS ☒ OTHER 30% High Solids	HOW MANY GALLONS OF WATER MIXED PER BAG OF CEMENT OR BENTONITE? 14-15	NUMBER OF BAGS OF GROUT USED: 14; POUNDS OF GROUT PER BAG: 50#
TYPE OF FILL MATERIAL USED: ☐ GRAVEL ☐ AG-LIME ☐ SAND ☐ OTHER N/A	AMOUNT OF FILL MATERIAL USED: N/A CU. YDS./TONS		DEPTH TO TOP OF FILL MATERIAL FROM THE SURFACE: N/A
MULTIPLE WELLS ☒ YES ☐ NO	WELL CHLORINATED BEFORE PLUGGING? ☐ YES ☒ NO	AMOUNT USED FOR THE CHLORINATION: ____ GALLONS OF CHLORINE ____ POUNDS OF CHLORINE ____ TABLETS OF CHLORINE	DATE WELL WAS PLUGGED: 10/3/01
WAS THE WELL ABANDONED BECAUSE OF HOOKING UP TO A PUBLIC OR RURAL WATER SUPPLY DISTRICT? ☐ YES ☒ NO			
IF YES, WHAT IS THE NAME OF THE WATER DISTRICT:	REASON WELL WAS PLUGGED		
REMARKS			

I HEREBY CERTIFY THAT THE WELL HEREIN DESCRIBED WAS PLUGGED IN ACCORDANCE WITH THE DEPARTMENT OF NATURAL RESOURCES REQUIREMENTS FOR THE PLUGGING OF WELLS.

SIGNATURE (PRIMARY CONTRACTOR)	PERMIT NUMBER	SIGNATURE (CONTRACTOR)	PERMIT NUMBER	DATE
X Dan Price (CH2M Hill)	0024'0-M	X Jim Crowley	003211WPM	10/11/01

MO 780-1603 (4-99)

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ENCLOSE NO FEE WITH REGISTRATION RECORD WITHIN 60 DAYS AFTER WELL COMPLETION